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鳞毛蕨科——蕨类植物的一新科

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DRYOPTERIDACEAE——A NEW FERN FAMILY

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Dryopteridaceae Ching, fam. nov. **鳞毛蕨科**,新科

Aspidiaceae tribus *Dryopterideae* Ching, Sunyatsenia **5**: 247. 1940.

Dennstaedtiaceae subfam. *Dryopteridoideae* Holttum, Journ. Linn. Soc. Bot. **53**: 149. 1947 et Biol. Rev. **24**: 291. 1949, pro parte.

Familia nova proxime affinis *Aspidiaceis,* a quibus differt fronde textura chartacea vel coriacea, raro herbacea, colore in sicco supra laete viridi, subtus pallide lutescente, plerumque copiose paleacea, sed pilis claris, multicellularibus, intestiniformibus carente; costis costulisque supra profunde sulcatis nudisque (i.e. pilis ctenitiformibus destitutis), marginibus lateralibus crassis, latere inferiore in rachim vel costas sub angulo angusto decurrentibus, sed ad insertiones costarum pinnarum costularumque pinnularum interruptis; venis liberis vel rarissime paulum anastomosantibus (venatio cyrtomii), simplicibus vel furctis, apicibus venularum in hydathodas terminantibus et marginem folii non attingentibus.

Filices terrestres, mediocres. Rhizomate structura radiali, crasso, erecto vel raro repente, paleis magnis, lanceolatis usque ad ovatis, brunneis, fusco-brunneis vel nigris, firmulis, margine integris, dentatis vel fimbriatis, basi affixis plerumque densissime obtecto. Frondibus fasciculatis, approximatis vel raro distantibus, stipitatis; stipite basi rhizomati continuo, fasciculis vascularibus pluribus, dictyostelico, plerumque paleis iis rhizomatis similibus vel minoribus dense vestito; lamina lineari-lanceolata, oblonga usque ad late deltoidea, divisione valde variante, aut simpliciter pinnata, aut bipinnatifida usque ad tripinnata, aut decomposita, textura chartacea vel coriacea, raro herbacea, colore in sicco supra laete viridi, subtus pallide lutescente, glabra vel saepe plus minusve paleacea vel utrinque dense fibrillosa, pilis unicellularibus vel multicellularibus intestiniformibusque carente; pinnis aut pinnulis basi aequalibus vel inaequalibus (i.e. latere anteriore plus minusve auriculatis), margine serratis vel aristato-serratis; costis costulisque subtus teretis, saepe plus minusve paleaceis vel fibrillosis, supra profunde sulcatis nudisque (i.e. sine pilis multicellularibus intestiniformibus), marginibus lateralibus crassis, latere inferiore in

rachim vel costas sub angulo angusto decurrentibus, sed ad insertiones pinnarum aut pinnularum interruptis. Venis liberis, simplicibus aut furcatis vel rarissime paulum anastomosantibus (venatio cyrtomii), apicibus saepe in hydathodas clavatis terminantibus, marginem folii non attingentibus. Soris globosis, parvis, indusiatis (rarissime exindusiatis), distinctis, in dorso aut apice venularum sitis; indusiis plerumque magnis, brunneis, membranaceis vel coriaceis, glabris, aut rotundo-peltatis et centro affixis, aut rotundo-reniformibus et sinu profundo affixis, persistentibus vel raro caducis. Sporis bilateralibus, ovalibus vel oblongis, exosporis, exosporiis alatis.

Ca. 14 genera et 1200 species per totum orbem praecipue regionibus temperatis borealibus et montibus subtropicae dispersae.

Typus familiae: *Dryopteris* Adans.

Genera: *Dryopteris, Stenolepia, Arachniodes, Leptorumohra, Acrorumohra, Microchlaena, Phanerophlebiopsis, Phanerophlebia, Polystichum, Cyclopeltis, Cyrtomium, Cyrtogonellum, Cyrtomidictyum, Sorolepidium.*

From the above component genera one can see that the family *Dryopteridaceae* are mainly ferns of the temperate regions and the mountains of subtropics in the Northern Hemisphere with one outlying genus, *Phanerophlebia,* in the tropical South America.

In contrast to *Aspidiaceae,* the taxon *Dryopteridaceae* was first proposed by me over five years ago (Flora Reipublicae Popularis Sinicae **2**: 69. 1959), and until now has remained a *nomen nudum.*

Tribus **Polysticheae** Ching, trib. nov. Sori indusiis rotundopeltatis et centro affixis preaditi, vel interdum exindusiati atque frons simpliciter pinnata (rarissime integra), pinnis lateralibus integris vel crenatis.

Typus tribus: *Polystichum* Roth.

Tribus **Dryopterideae** Ching, trib. nov. Sori indusiis rotundoreniformibus et sinu profundo affixis praediti, vel interdum exindusiatis atque frons 2—3-pinnata vel pinnis lateralibus saltem inciso-serratis.

Typus tribus: *Dryopteris* Adans.

鳞毛蕨这一大羣植物过去一直归入三叉蕨科 *Aspidiaceae*。1959 年作者在中国植物志第二卷 69 頁第一次把它从三叉蕨科分立出来，提出了鳞毛蕨科 *Dryopteridaceae* 这个名称，但迄今仍为一个裸名（*nomen nudum*），本文第一次正式发表，以符合国际植物命名法的規定。

鳞毛蕨科与三叉蕨科表現出許多区别，主要的在于其叶为紙質或革質，罕为草質，干后上面淡綠色，下面灰淡黃色，并且通常被有很多鳞片，而沒有透明、多細胞的、腊腸形的密毛；羽軸和小羽軸及主脉下面呈圓形隆起，通常多少被鳞片或纖維状鳞毛。上面具深纵沟并且光滑，纵沟两側的边緣加厚，于羽軸小羽軸着生处断裂，并和相关的叶軸及羽軸上面的纵沟互通，其下側边基部則以銳角下延于叶軸和羽軸；叶脉分离，单一或分叉，或罕有多少結成貫众型的网眼（如貫众属 *Cyrtomium*），小脉頂端常有膨大的水囊，但不达叶边。

科的模式：鱗毛蕨属 *Dryopteris* Adans.

本科現知有 14 个属，約 1200 种，广布世界溫带和亚热带高山，除 *Phanerophlebia* Presl 一属产热带南美洲外，有 12 个属产中国及邻近国家，其中有 6 个属特产于中国-喜馬拉雅及日本，而广布的鱗毛蕨属有 350 种，耳蕨属有 480 种，为我国两个最大的蕨属，幷以中国为分布中心。

除在形态学和細胞学上的区别外，植物地理分布区也是往往与分类学有关的重要問題。鱗毛蕨科在地理分布上也与三叉蕨科显然不同，前者主产于北半球溫带及亚热带高山林下，而后者則为泛热带植物，在我国主要分布于峨眉山山麓与南岭山脉一綫以南，尤以两广及云南南部最为集中。

关于鱗毛蕨科的組成属的問題，学者們的看法还是不完全一致的。英国 Holttum 在 1947 年提出了鱗毛蕨亚科 *Dryopteridoideae* 这个名称，他列举了 14 个属作为这个亚科的組成属，但根据作者多年来研究表明，其中許多属不应归入这个亚科。例如岩蕨属 *Woodsia* 作者早在 1940 年发表的"水龙骨科的自然分类"一文中（中山大学植物研究所学报 5 卷，202—268 頁）已另立为一个新科 *Woodsiaceae*，云南和喜馬拉雅特产的滇蕨属 *Cheilanthopsis* Hieron. 也应归入此科。又如主产中国-喜馬拉雅的 *Diacalpe*, *Perenema*, *Acrophorus* 和 *Lithostegia* 这 4 个属，作者在同年也另立了一个新科 *Perenemaceae*。又如泛热带产的 *Didymochlaena* 属作者也于同年另立了一个新科 *Didymochlaenaceae*，它与鱗毛蕨科可說毫无亲緣关系。再如 *Gymnocarpium* 这个北溫带的属已为作者归入蹄盖蕨科。至于还有其它热带美洲的两个属 *Maxonia* 和 *Polybotrya*，似乎很难看出与鱗毛蕨科的关系。

总的說来，最近二、三十年，一些学者对于薄囊蕨类所进行的深入細致的研究結果，第一次明确了三叉蕨科与鱗毛蕨科是两个自然的而在系統上又有联系的科，这是蕨类植物分类学上的一大进展，特别对于形体宛如鱗毛蕨类的叶脉分离的一些属，如 *Ctenitis*, *Ctenitopsis*, *Lastreopsis* 等第一次被認为是代表三叉蕨科的合法的原始类型这一点的認識，使两科的界說进一步得到明确，这应該說是人类認識自然奥秘的一个发現。这一发現揭露了美国学者 Copeland 的所謂"*Aspidiaceae*"科的概念是何等含糊不清，連他自己也說"如同凤尾蕨科的描述一样，这个三叉蕨科的描述对于那些要用它来决定一个不知道科的属的人們来說，是无用的"。这眞是个植物分类学史上的謬論，实际上，这暴露了他对蹄盖蕨类与金星蕨类，三叉蕨类与鱗毛蕨类彼此間的区别与相互关系的无知外，再也不能說明什么了。

根据囊羣盖的形态和着生方式，鱗毛蕨科可分为下面两个族：

I. 耳蕨族 *Polysticheae* 孢子囊羣盖圓盾形，以中央盾状着生，或偶有无盖，則叶片一回羽状（偶有单叶），側生羽片全緣或略具圓齿。

族的模式：*Polystichum* Roth.

II. 鱗毛蕨族 *Dryopterideae* 孢子囊羣盖为圓腎形，以深缺刻着生，或有时无盖，側叶片为二至三回羽状或至少側生羽片羽状銳裂。

族的模式：*Dryopteris* Adans.

The family *Dryopteridaceae* is a very natural one, and I agree with Holttum that it is distinct from the tectarioid ferns by the characters as first pointed by him and here

once again more fully reenforced in the above diagnosis, by which some free-veined genera such as Ctenitis and its immediate allies, which have almost always been considered by authors to be dryopteroid ferns, will thus naturally fall under the family *Aspidiaceae,* their affinity with tectarioid ferns having already been suspected by C. Christensen (Verdoorn, Manual of Pteridology, p. 544. 1938), in spite of their similarity in general appearance with dryopteroid ferns (e.g. *Dryopteris filix-mas* Adans.). Holttum (loc. cit.) has explicitely pointed out that *Ctenitis* is the basic genus of his subfamily Tectaridoideae, to which may further add *Lastreopsis* and *Ctenitopsis,* the latter genus stands exactly midway between *Ctenitis* and *Tectaria* in the point of venation pattern, a transition in evolution from the free-veined to the copiously netted-veined genera, but cannot satisfactorily be referred either to *Ctenitis* or to *Tectaria* as some authors have thought.

Apart from the morphological (and also cytological) differences between *Aspidiaceae* and *Dryopteridaceae,* it is also often essential to know something of their geographical background. The tectarioid ferns are pantropical in origin, while the dryopteroid are temperate ferns, particularly in the Northern Hemisphere, extending over the mountains in the subtropics, apparently with their geographical center in the Sino-Himalayan region, where from 12 genera out of a total of 14 ascribed to the family are so far known.

The question about the constituent genera of *Dryopteridaceae* remains a point of contention, for different authors often vary to some extent as to the number of genera included. Under his subfamily *Dryopteridoideae,* Holttum, in contrast to what I proposed above, listed the following 14 genera: *Woodsia, Stenolepia, Acrophorus, Diacalpe, Perenema, Lithostegia, Dryopteris, Polystichum, Polystichopsis, Cyrtomium, Didymochlaena* (*Maxonia* and *Polybotrys*?); *Gymnocarpium.* As already pointed out by me long ago (Sunyatsenia **5**: 202—268. 1940), *Woodsia* of an arctic-boreal origin should be treated as a family of its own, to which *Cheilanthopsis* Hieron. from Western Yunnan and the Himalayas must be added; the Sino-Himalayan *Diacalpe, Perenema, Acrophorus* and *Lithostegia* constitute another natural family *Perenemaceae,* and the peculiar pantropical genus *Didymochlaena* also a family by itself; while *Gymnocarpium* has been treated by me as a member of *Athyriaceae,* and *Maxonia* and *Polybotrya* seem to be hardly belonging here.

Nevertheless, it can hardly be over-emphasized that in the last two or three decades some of the contemporary pteridologists have, through painstaking work and especially by the exposition of minute characters as indications of affinity between otherwise seemingly resembling groups, shed much new light on the phylogeny of ferns. Recognition of the dryopteroid ferns to be taxonomically distinct (whether be a family or a subfamily) from the tectarioid, particularly of the free-veined genus *Ctenitis* and its allies (for a long time united to *Dryopteris*) to be primitive tectarioid ferns, is certainly a great contribution towards the understanding of the two high-ranking taxa of Eusporangiate Ferns, which

together with *Thelypteridaceae* and *Athyriaceae* were merged by Copeland (Genera Filicum p. 100. 1947) in his "*Aspidiaceae*" the circumscription of which being so vague that even he had to apologize for himself by saying, "The description of *Aspidiaceae* is as useless as that of *Pteridaceae,* for those who might seek by it to place an unknown member". What a joke! Nothing but that exposing his inadequate knowledge of the distinctions between the athyrioid and thelypteroid, and the tectarioid and dryopteroid ferns, and all of their interrelationships.